

BEFORE THE PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA

DOCKET NO. 2018-318-E

In the Matter of :

Application of Duke Energy Progress, LLC
For Adjustments in Electric Rate Schedules and
Tariffs

) **DIRECT TESTIMONY OF**
) **DR. JULIUS A. WRIGHT**
) **FOR DUKE ENERGY**
) **PROGRESS, LLC**

I. INTRODUCTION AND PURPOSE

1 **Q. PLEASE STATE YOUR NAME, OCCUPATION, TITLE AND**
2 **BUSINESS ADDRESS.**

3 A. Julius A. Wright, Managing Partner, J. A. Wright & Associates, LLC, 18
4 Edgewater Drive, Cartersville GA, 30121. I am a consultant to regulated
5 utilities and regulatory agencies and other public bodies on issues related to
6 economics, economic modeling, regulatory policy, industry restructuring,
7 demand-side investments, and resource planning.

8 **Q. ON WHOSE BEHALF ARE YOU SUBMITTING THIS TESTIMONY?**

9 A. I am submitting this testimony on behalf of Duke Energy Progress, LLC (“DE
10 Progress,” or the “Company”).

11 **Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL**
12 **EXPERIENCE.**

13 A. I received an undergraduate degree from Valdosta State College (BS
14 Chemistry), an MBA in Finance from Georgia State University, and a
15 Master’s and Ph.D. in Economics from North Carolina State University,
16 where I focused on regulatory and environmental economics. Among other
17 past experiences, I served as a Commissioner on the North Carolina Utilities
18 Commission (“NCUC” or the “Commission”) from 1985 to 1993. Prior to
19 serving as a member of the Commission, I served three terms as a North
20 Carolina State Senator and worked in process engineering for 12 years at three
21 chemical plants, the last with Corning in Wilmington, NC.

1 Over the past 25 plus years in my consulting practice, I have dealt
2 extensively with electric and natural gas utilities focusing on a number of
3 issues. In this context, I have testified before regulatory commissions and
4 legislative bodies, presented studies and authored reports on issues related to
5 electric and gas regulation, and I have been a guest speaker at the Bonbright
6 Conference, other seminars, and at the Georgia Institute of Technology. I
7 have been a visiting professor teaching both microeconomics and
8 macroeconomics courses at the University of The Virgin Islands. I was also
9 one of three economists engaged by the California State Auditor to examine
10 the problems that led to that state's electric energy crisis in the summer and
11 fall of 2000. I have worked for the last 20 plus years in the field of electric
12 and gas regulation, primarily in the Southeast. A copy of my resume is
13 attached as Wright Exhibit 1.

14 **Q. PLEASE DISCUSS THE PURPOSE OF YOUR TESTIMONY.**

15 A. The purpose of my direct testimony is to support DE Progress' request to
16 recover costs incurred for coal ash disposal in response to new, more stringent
17 environmental regulations.

18 **Q. PLEASE SUMMARIZE YOUR TESTIMONY.**

19 A. In the next section of my testimony, I provide a discussion of the general
20 regulatory principles dealing with the recovery of environmental costs
21 incurred by electric utilities in South Carolina. In Section III, I provide a brief
22 historical review of coal ash disposal regulations, how these regulations have
23 evolved over time, and how these evolving regulations have impacted the

1 Company. I conclude in Section IV by discussing why I believe DE Progress’
2 proposed coal ash related expenses in this filing should be recoverable as
3 recommended in the application and Company witnesses’ testimony.

4 **II. BACKGROUND:**
5 **RECOVERY OF ENVIRONMENTAL COSTS**

6 **Q. WHAT ARE RECOVERABLE COSTS AS THEY RELATE TO**
7 **ELECTRIC UTILITY EXPENDITURES IN SOUTH CAROLINA?**

8 A. Recoverable costs include costs that are just and reasonable and used and
9 useful in the provision of adequate, safe, reliable, and reasonable electric
10 service to a utility’s customers. Specifically, South Carolina Code of Laws at
11 § 58-27-810 declares the “rates shall be just and reasonable,” and this standard
12 is repeated in § 58-27-850. With respect to the “used and useful” standard,
13 like other states South Carolina has defined used and useful utility property as
14 “property which it [the utility] necessarily devotes to rendering the regulated
15 services” and has allowed recovery for such property in rates. *Hamm v. S.C.*
16 *Pub. Serv. Comm’n*, 309 S.C. 282, 286 n. 1, 422 S.E.2d 110, 112 n. 1 (1992)
17 (quoting *Southern Bell Tel. & Tel. Co. v. Pub. Serv. Comm’n of S.C.*, 270 S.C.
18 590, at 600, 244 S.E.2d 278, at 283 (1978)).

19 The “used and useful” definition as it relates to rate base in South
20 Carolina was clarified in a Commission Order that stated “The rate base is
21 comprised of the value of the Company’s property used and useful in
22 providing retail electric service to the public...” Order 87-1381, December 30,
23 1987, page 15.

24 With respect to the how retail electric service must be provided to

1 South Carolina ratepayers, the Commisison's Code of Regulations Section
2 103-301(2) states the purpose of the Code of Regulations is to "*to define good*
3 *practice...intended to insure adequate and reasonable service.*" All of these
4 policies, along with safety and reliability, are further embodied in the Code of
5 Regulations in Sections 103-360 which states "[t]he electric plant of an
6 electrical utility shall be constructed, installed, maintained and operated in
7 accordance with good engineering practice to assure, as far as reasonably
8 possible, continuity of service, uniformity in the quality of service, and the
9 safety of persons and property."

10 As I discuss further herein, because environmental compliance costs
11 are a necessary used and useful cost of providing safe, reliable and adequate
12 electric service, then it follows that these types of costs – and a return on those
13 costs – are recoverable in rates.

14 **Q. ARE ENVIRONMENTAL COMPLIANCE COSTS A NECESSARY**
15 **EXPENDITURE SIMILAR TO OTHER COSTS A UTILITY MIGHT**
16 **SPEND IN PRODUCING AND DELIVERING POWER?**

17 A. Yes. In order to comply with environmental regulations the Company incurs
18 costs and these are similar to other costs necessary for the generation of
19 electric power. Thus as part of the operating expenses related to coal-fired
20 generating facilities, coal combustion residuals ("CCR") is produced in the
21 coal combustion process, and this ash has been collected in compliance with
22 environmental regulations at the time. These environmental expenses include
23 costs like scrubbers or coal ash facilities which can be rate base type expenses

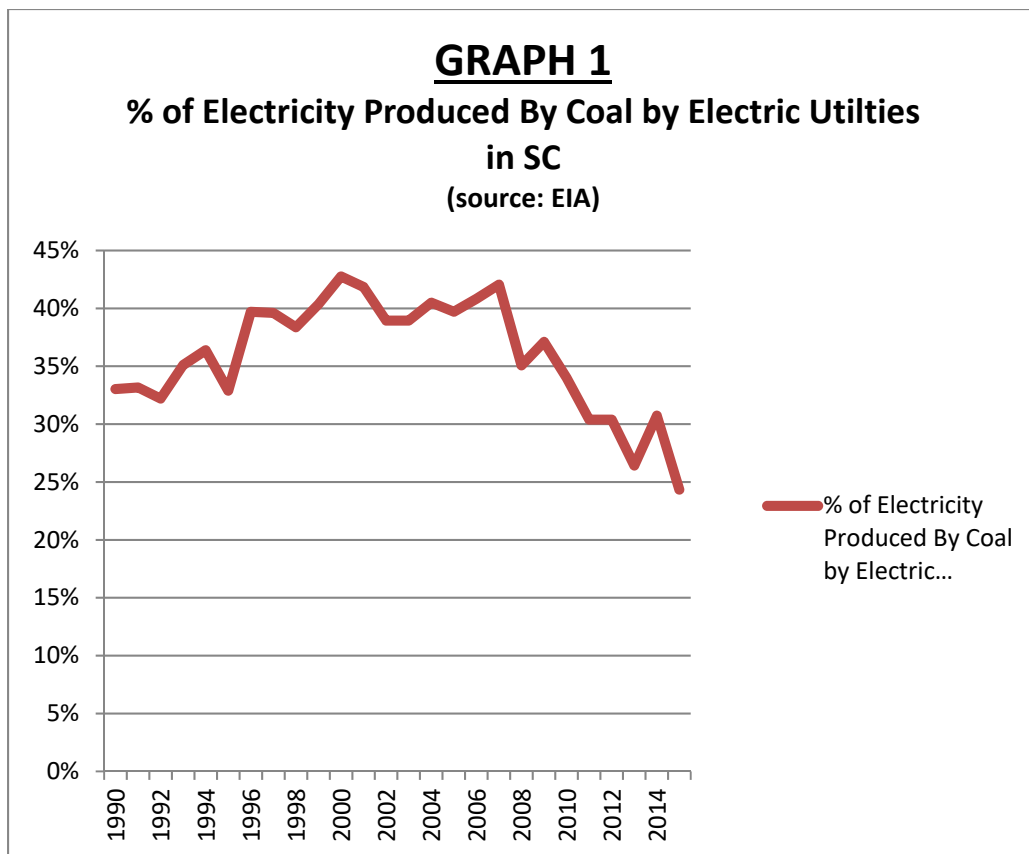
1 whose costs would be recovered over time. In addition, environmental costs
2 related to the treatment of pollutants, like ammonia and lime, or the cost of
3 emission allowance for SO₂, NO_x, mercury, and particulates, are all variable
4 environmental costs and are generally recoverable through the fuel adjustment
5 rider in South Carolina (§ 58-27-865). All of these environmental costs are
6 necessary for producing electricity in compliance with environmental
7 standards and, like nuclear decommissioning costs or coal plant retirement
8 costs, based on my experience and knowledge of fuel adjustment cost
9 recovery mechanisms in many states, these types of costs have long been
10 deemed recoverable from a utilities' ratepayers, including DE Progress in
11 South Carolina.

12 It should also be recognized that the coal plants associated with these
13 costs have been used and useful in providing low-cost, reliable power to South
14 Carolina customers for more than a century, and that is true regardless of
15 whether the generating plant is located in South Carolina or North Carolina –
16 all of the Company's generating units provide service on a systemwide basis
17 to both states. Consequently, these types of costs and, if any amount is
18 deferred over time, a return would be appropriately recoverable in rates to
19 ensure that the Company received the equivalent of the full amount of those
20 costs.

1 **Q. WHY HAVE YOU CONCLUDED THAT THESE COAL-FIRED**
2 **ELECTRIC GENERATING PLANTS HAVE BEEN USED AND**
3 **USEFUL IN THE PROVISION OF LOW-COST ELECTRIC SERVICE**
4 **TO CUSTOMERS IN SOUTH CAROLINA.**

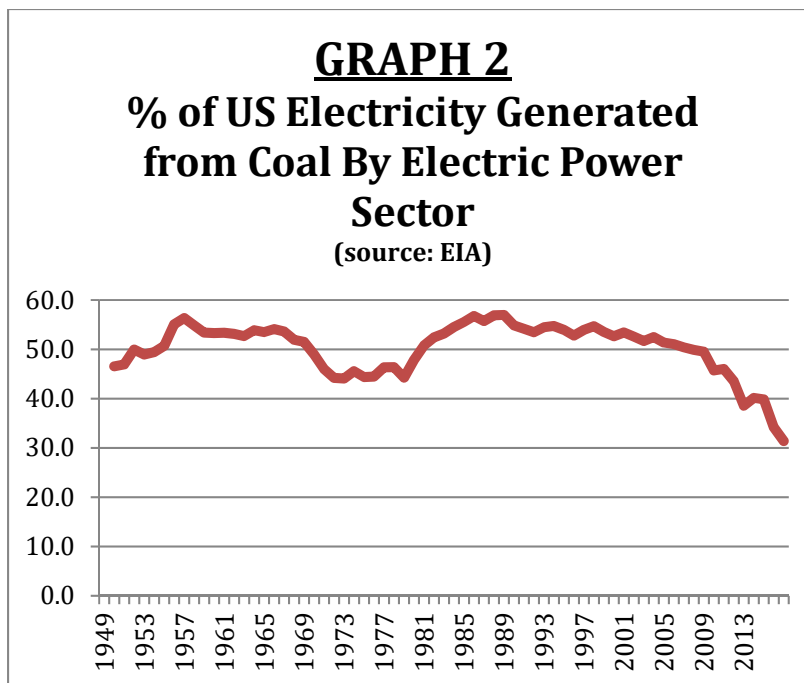
5 A. The Company's electric power generation from burning coal dates back to the
6 1920's. For example, the Cape Fear Plant in Moncure, North Carolina, began
7 commercial operation in 1923 with an ultimate generating capacity of 316
8 MW. Because power generation facilities are generally operated on a lowest
9 cost facility being used first, one can conclude that the Company's coal plants
10 have been used and useful in providing low-cost, reliable power to South
11 Carolina customers for more than a century. This conclusion is illustrated in
12 Graph 1 that illustrates that since 1990 (the earliest data available for the EIA)
13 usually more than 30% of the South Carolina's electric generation was
14 provided by coal-fired generation.¹ While more recently this dependence on
15 coal has diminished because of new environmental standards, coal-fired
16 generation continues to be an important component of DE Progress'
17 generation in South Carolina.

¹ This was the latest statewide data available from the EIA when the first draft of this testimony was developed. See State Historical Tables for 2015 (October 2016 as revised November 2016) (<https://www.eia.gov/electricity/data/state/>).



1 For a more historic perspective on the importance of coal to the
 2 nation's electric industry, Graph 2 indicates that for the past seven decades
 3 coal has provided the fuel to produce about 50% of the nation's electric
 4 energy.² It should be noted that coal was chosen as a fuel source, both in
 5 South Carolina and nationwide, primarily on the basis of economics, meaning
 6 that at the time it was the least costly, reliable option to use as a generation
 7 fuel resource. Because of this economic fact, but for the use of coal-fired
 8 generation, historical electric prices in the State and nationwide would have
 9 been higher.

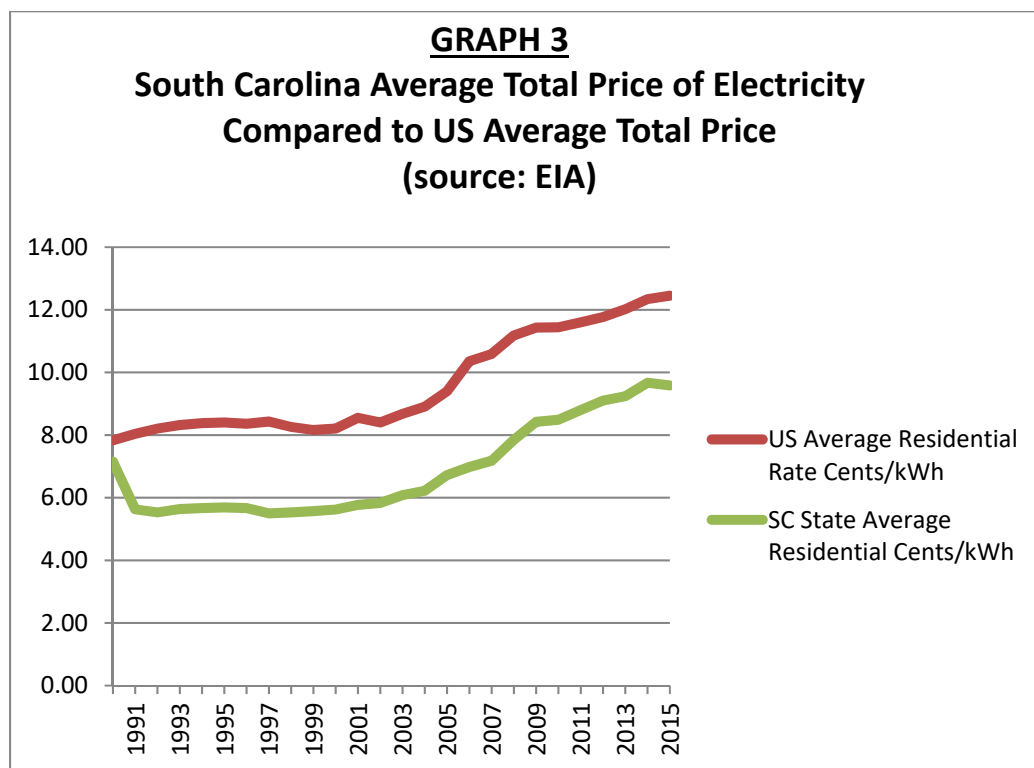
² This was the latest nationwide data available from the EIA. See April 2017 Monthly Energy Review, Table 7.2b Electricity Net Generation: Electric Power Sector (April 25, 2017) (<https://www.eia.gov/totalenergy/data/monthly/archive/00351704.pdf>).



1 In addition, the use of DE Progress’ coal-fired generation has directly
 2 benefitted the State’s customers by virtue of the fact that South Carolina’s
 3 average retail electric rates have historically been below the national average.
 4 This is shown in Graph 3 which provides a historical comparison of the
 5 State’s average electric price to the nation’s. As this Graph 3 indicates, the
 6 State’s average electric prices have been below the national average since at
 7 least 1990, which is the first year this state level data was available at the EIA.
 8 These below national average electric rates have been an economic benefit to
 9 South Carolina and its electric consumers.³ Because electric rates are
 10 determined by the underlying cost to produce the electricity, and recognizing
 11 that coal-fired plants were chosen and are dispatched primarily for economic
 12 reasons, this simply means that the State’s “below average” electric rates have

³ This was the latest statewide data available from the EIA. See
<https://www.eia.gov/totalenergy/data/annual/showtext.php?t=ptb0810>.

1 been achieved in large measure because of the State's use of its coal-fired
2 electric generation.



3 **Q. HAS THIS COMMISSION ALLOWED THE RECOVERY OF COSTS**
4 **RELATED TO ENVIRONMENTAL EXPENDITURES?**

5 **A.** Yes. I have already discussed how some environmental costs in South
6 Carolina, such as ammonia, lime and other reagents, are recovered through the
7 fuel adjustment rider (§ 58-27-865). Importantly, the recovery of other
8 environmental costs, such as scrubbers or ash basins, related to environmental
9 compliance would be consistent with the public policy of the South Carolina
10 which states it is “the public policy of the State to maintain reasonable
11 standards of purity of the air and water resources of the State, consistent with
12 the public health, safety and welfare of its citizens, maximum employment,

1 the industrial development of the State...” (at § 48-1-20).

2 Consequently, in order to comply with both the State’s public policy
3 goals and remain compliant with environmental standards, the Company has
4 made numerous investments over time in compliance with historical coal ash
5 and other environmental regulations, as discussed at length in the direct
6 testimony of Company Witness Kerin. It is my experience that these types of
7 costs, including the reasonable costs associated with operating, maintaining
8 and upgrading environmental equipment, plus a return, have been routinely
9 recovered as a cost of service through general rate cases, whether as capital or
10 ongoing operation and maintenance expense or some combination thereof.

11 In summary, when a utility invests in scrubbers to meet new and
12 heightened environmental standards, these costs have routinely been
13 recoverable. Similarly, when a utility invests dollars to meet new
14 environmental coal ash remediation standards, these costs should likewise be
15 recoverable. For example, in South Carolina the deferral balance of costs
16 associated with a Cliffside Unit 5 scrubber were amortized and in the rate base
17 (Settlement Agreement, Nov. 30, 2011, Docket No. 2011-271-E, Attachment
18 A, page 2). In addition, in Docket No. 2009-226-E costs associated with
19 scrubbers at the Allen Steam Station were amortized and in rate base
20 (Settlement Agreement, Nov. 24, 2009, Docket No. 2009-226-E, Attachment
21 A, page 2).

22 Where state specific requirements are indicated, those costs are often
23 shared between the two states consistent with the manner in which electrons

1 flow. In other words, shared costs for facilities that generate or have
2 generated electricity to both North and South Carolina are allocated between
3 the two states.

4 **Q. HAS THIS COMMISSION ADDRESSED THE RECOVERY OF NEW**
5 **COSTS ASSOCIATED WITH COAL ASH DISPOSAL ?**

6 A. Yes. In Docket No. 2016-227-E, DE Progress was allowed to recover coal
7 ash expense amortized over fifteen (15) years plus the Order's approved
8 return, albeit the Order did state that this finding had no precedential effect
9 and will not prejudice the position of any Party in any future proceeding
10 before the Commission.⁴ In this case, the Company is asking to be allowed to
11 recover coal ash expenses amortized over five years.

12 **Q. HOW ARE COSTS RECOVERED WHEN THE COSTS RELATE TO**
13 **FACILITIES IN TWO DIFFERENT STATES, LIKE WITH THE**
14 **ELECTRIC SYSTEM IN NORTH CAROLINA AND SOUTH**
15 **CAROLINA?**

16 A. Under this scenario, cost recovery depends on the type of cost. Some state
17 specific costs, unless directly assigned, are shared, or allocated, between both
18 states. In other words, shared costs for facilities that generate or have
19 generated electricity to both North and South Carolina are usually allocated
20 between the two states. These type of costs include a variety of things such as
21 workers compensation type costs, differences in everyday operating costs like
22 employees expenses, contractor expenses, fuel costs, and even costs like fuel

⁴ Order in Docket No. 2016-227-E, Dec. 21, 2016, page 11, paragraph 15.

1 transportation which can be different depending on the location of a
2 generating station (for example, rail service from coal mines to North Carolina
3 can be different, and usually cheaper because of distance, then rail service to
4 South Carolina). In addition, property taxes in South Carolina are higher than
5 property taxes in North Carolina, however these taxes for system assets like
6 generation plants are allocated to the whole system and not recovered on a
7 state specific basis.

8 **Q. HAVE NORTH CAROLINA AND SOUTH CAROLINA SHARED**
9 **ENVIRONMENTAL EXPENSES PRIOR TO THIS CASE?**

10 A. Yes. For example, the Cliffside and Allen generating stations scrubbers
11 mentioned above have been costs shared between the two states. This cost
12 sharing is common where a utility's operations span multiple states and the
13 utility property used to provide one particular state's electric service may be
14 located in another state. Also, the Company has entered into a Consent
15 Agreement with the South Carolina Department of Health and Environmental
16 Control (and a related Settlement Agreement with several environmental
17 groups) dealing with coal ash at the Robinson Plant, and the costs associated
18 with these South Carolina agreements are shared with North Carolina
19 ratepayers. Additional examples of states sharing environmental costs would
20 be the Southern Company utilities in Georgia, Alabama, Mississippi, and
21 Florida, and Entergy with electric utility services in Mississippi, Arkansas,
22 Louisiana, and Texas. In addition, coal ash disposal costs and beneficial reuse
23 revenues have to date been allocated and shared between both states.

1 **III. A BRIEF REVIEW OF THE HISTORY OF**
2 **COAL ASH DISPOSAL STANDARDS**

3 **Q. PLEASE DISCUSS SOME OF THE INITIAL COAL ASH DISPOSAL**
4 **STANDARDS.**

5 A. The Company's electric power generation from burning coal dates back to the
6 1920's. All of the Company's coal plants produced CCRs as fly ash and
7 bottom ash as direct by-products of the coal combustion process. In the
8 1950's the electric utility industry began to transport bottom ash by water
9 sluicing to constructed surface impoundments, which we commonly refer to
10 as ash basins. Over time, as discussed in more detail in the direct testimony of
11 Company Witness Kerin, the Company has consistently followed industry
12 standard practices in compliance with coal ash regulation.

13 **Q. DID THE COMMISSION ALLOW THE STATE'S ELECTRIC**
14 **UTILITIES TO RECOVER THE COSTS ASSOCIATED WITH THESE**
15 **EARLIER COAL ASH DISPOSAL REGULATIONS?**

16 A. Yes. As I mentioned earlier, these types of expenses have been routinely
17 recovered as a cost of service and included in rate cases including the
18 reasonable costs associated with operating, maintaining and upgrading
19 environmental equipment. The cost recovery for these rate-based
20 environmental costs also usually included a return. Also, as I mentioned
21 earlier, in Docket No. 2016-227-E, the Commission allowed DE Progress to
22 recover coal ash expense amortized over fifteen (15) years plus the Order's

1 approved return.⁵

2 **Q. HOW HAVE THE COAL ASH DISPOSAL STANDARDS CHANGED**
 3 **OVER THE PAST DECADE?**

4 A. Coal ash use and disposal has been studied by the Environmental Protection
 5 Agency (“EPA”) since the mid-1980s. After several studies and some limited
 6 regulatory standards, on May 22, 2000, the Environmental Protection Agency
 7 (“EPA”) determined the need to regulate coal combustion wastes that are
 8 disposed in landfills and surface impoundments under Subtitle D (applicable
 9 to non-hazardous waste) of the Resource Conservation and Recovery Act.

10 On December 22, 2008, a dike at a surface impoundment at Tennessee
 11 Valley Authority's ("TVA") Kingston Fossil Plant in Harriman, Tennessee,
 12 failed. In part as a response to this TVA accident, on June 21, 2010, the EPA
 13 published in the Federal Register proposed new coal ash disposal regulations
 14 for CCRs.⁶ The proposed regulations specifically referenced the TVA
 15 incident as a major reason for the proposed rule.⁷ The EPA’s proposed coal
 16 ash disposal rule also discussed several other coal ash incidents that led to the
 17 promulgation of the rule:

18 *“at the time of the May 2000 Regulatory Determination, the*
 19 *Agency was aware of 14 cases of proven damages and 36 cases*
 20 *of potential damages resulting from the disposal of CCRs. The*
 21 *Agency has since learned of an additional 13 cases of proven*
 22 *damages and 4 cases of potential damages, including a*
 23 *catastrophic release of CCRs from a disposal unit at the*
 24 *Tennessee Valley Authority (TVA) Kingston facility in*
 25 *Harriman, Tennessee in December 2008. In total, EPA has*
 26 *documented 27 cases of proven damages and 40 cases of*

⁵ Order in Docket No. 2016-227-E, Dec. 21, 2016, page 11, paragraph 15.

⁶ Federal Register/Vol. 75, No. 118/Monday, June 21, 2010/Proposed Rules, page 35128.

⁷ IBID, page 35132.

1 *potential damages resulting from the disposal of CCRs. Proven*
 2 *damage cases have been documented in 12 states, and*
 3 *potential damage cases—in 17 states.”⁸*

4 A more thorough discussion of these newer coal ash disposal regulations is
 5 contained in the testimony of Company Witness Kerin.

6 **Q. DID THE ACCIDENTAL COAL ASH SPILL AT THE DUKE ENERGY**
 7 **CAROLINAS’ DAN RIVER FACILITY IMPACT THE FINAL CCR**
 8 **RULE?**

9 A. No. First, it is important to note that the EPA’s proposed rule’s publication
 10 date precedes the February 2, 2014 coal ash release accident at the Dan River
 11 Steam Station (“Dan River”), the Dan River accident was not mentioned in
 12 the EPA’s proposed rule, nor could it have been, as a reason for establishing
 13 the rule. Later, the finalized EPA rule, signed on December 19, 2014 and
 14 published in the *Federal Register* (FR) on April 17, 2015 (the “CCR Rule”),⁹
 15 did reference the Dan River accident, but it did not indicate that the accident
 16 modified the proposed rule. Second, in promulgating the CCR Rule the EPA
 17 cited hundreds of potential risks or incidents with ash ponds similar to Dan
 18 River that led to the adoption of the Rule. Based on the citing of these
 19 numerous incidents along with the timing of the CCR Rule, I would conclude
 20 that the Dan River accident did not change the CCR regulations, although it
 21 probably added support for the EPA’s proposals.

⁸ IBID, pages 35143, 35143.

⁹ See Federal Register/Vol. 80, No. 74/Friday, April 17, 2015/Rules and Regulations, page 21343; 21393-94.

1 **Q. HOW DID THE ACCIDENTAL COAL ASH SPILL AT THE**
2 **COMPANY’S DAN RIVER FACILITY IMPACT NORTH**
3 **CAROLINA’S CAMA LAW?**

4 A. Based on my review, it likely impacted the timing, but I cannot conclude that
5 it impacted the substance of the standards. There is no doubt that the Dan
6 River spill certainly helped prompt the North Carolina General Assembly to
7 examine the State’s and national coal ash disposal policies and regulations.
8 Out of that legislative investigation came North Carolina’s Coal Ash
9 Management Act (“CAMA”). However, some four years prior to the Dan
10 River accident, the EPA had already proposed and was close to finalizing its
11 new coal ash regulations. I feel confident the EPA’s proposed coal ash
12 regulations helped inform the State’s legislative leaders regarding the
13 language contained in CAMA for several reasons. First, having served in the
14 North Carolina General Assembly, I am sure that the legislative process
15 leading to CAMA included an investigation of, and used where appropriate,
16 the then current or proposed EPA coal ash standards. Second, there are many
17 similarities between the proposed EPA rule and CAMA. For example, both
18 discuss groundwater monitoring at length, both provide for the same two types
19 of coal ash pond closure methods, the definitions used in both are very similar
20 and sometimes use identical wording, and both contain three levels of
21 hazardous potential classifications associated with coal ash ponds.¹⁰

¹⁰ It should be noted that the risk levels identified in the EPA proposed rule were based on dam or dike structural integrity and the potential for loss of life or the level of economic harm. The levels of risk in CAMA considered structural integrity as one of several factors to consider and the risk was not strictly related to loss of life.

1 Finally, the proposed CCR regulation also strongly encouraged the
2 states to adopt at least the Federal minimum criteria in their solid waste
3 management plans.¹¹ Therefore, even without the Dan River accident in 2014
4 and the enactment of CAMA shortly thereafter, had CAMA not been enacted
5 in 2014, I believe that the State of North Carolina Legislature and/or the
6 State's Department of Environmental Quality may have taken steps to adopt
7 coal ash regulations similar to CAMA shortly after the CCR Rule was
8 finalized in 2015. Regardless, the Company must comply with both the
9 Federal and State coal ash disposal standards.

10 **Q. ARE THERE ANY SOUTH CAROLINA STATE SPECIFIC LAWS OR**
11 **GUIDELINES THAT THE COMPANY MUST FOLLOW IN ITS**
12 **DISPOSAL OF CCRS?**

13 A. Yes. For DE Progress in South Carolina there is one Consent Agreement with
14 DHEC applicable to ash management at the Robinson Plant. The Robinson
15 Consent Agreement, DHEC 15-23-HW, between Duke Energy Progress, Inc
16 (now DE Progress) and DHEC, requires ash excavation of a 1960 lay-of-land
17 ash storage area located south of the ash basin. This Consent Agreement also
18 includes provisions to initiate permitting of an on-site CCR lined landfill to
19 store the excavated ash.

20 Additionally, the South Carolina legislature passed H.B. 4857 in 2016,
21 which requires utilities to dispose of coal combustion residuals resulting from
22 the production of electricity to be placed in Class 3 landfills, except under

¹¹ Federal Register/Vol. 80, No. 74/Friday, April 17, 2015/Rules and Regulations, page 21430.

1 limited circumstances.

2 **Q. WHAT ARE THE SPECIFIC COAL ASH DISPOSAL STANDARDS**
3 **THAT DE PROGRESS MUST NOW MEET WITH RESPECT TO ITS**
4 **CURRENT COAL ASH DISPOSAL SITES?**

5 A. Company Witness Kerin discusses these standards in detail. In short, the
6 Company must comply with the 2015 Federal CCR Rule adopted by the EPA
7 which established national minimum criteria for active CCR landfills and
8 basins and inactive basins containing water, it must also comply with any
9 CAMA obligations (which are similar to the CCR Rule as discussed by
10 witness Kerin), and it must comply with the Robinson Consent Agreement as
11 well as two Settlement Agreements¹² between the Company and North
12 Carolina regulators and any other state agency requirements, such as those
13 that may be required by DHEC.

14 **IV. THE COMPANY'S PROPOSED COAL ASH COST**
15 **RECOVERY PROPOSAL IS REASONABLE**

16 **Q. WHAT ARE THE COSTS THE COMPANY IS SEEKING TO**
17 **RECOVER THAT YOUR TESTIMONY ADDRESSES?**

18 A. DE Progress has reasonably and prudently incurred and expects to incur a
19 total of \$526.4 million (on a system basis) related to incremental ash pond
20 closure compliance costs from July 2016 through December 2018.

¹² A Sept. 29, 2015 Settlement Agreement Between DE Progress and the North Carolina Department of Environmental Quality with regard to four generating facilities and an agreement between the Company and the same NC agency regarding the Asheville and H.F. Lee generating facilities.

1 **Q. THE COMPANY IS ALSO ASKING THE COMMISSION TO ALLOW**
2 **THE COMPANY TO DEFER COAL ASH RELATED EXPENSES**
3 **PENDING RECOVERY ADJUDICATION IN A FUTURE RATE**
4 **CASE. IS THIS A COMMON PRACTICE UNDER SOUTH**
5 **CAROLINA REGULATORY PROCEDURES?**

6 A. Yes. A deferred account mechanism is not unusual in ratemaking. In his
7 book discussing utility regulation Goodman indicates that “The use of
8 deferred cost accounting in the ratemaking context is so common and so
9 fundamental a regulatory tool that no agency is likely to consider it necessary
10 to study whether as a matter of policy costs should be deferred...”¹³ In
11 Docket No. 2015-96-E (Order No. 2015-308) this Commission allowed the
12 Company to defer costs associated with coal ash related environmental
13 remediation costs. DE Carolinas also has a currently effective deferral
14 approved in the Commission’s Order in Docket No. 2016-196-E, dated July
15 13, 2016. DE Progress has a similar deferral that is ongoing, which was
16 approved in the Order in Docket No. 2016-227-E, dated December 21, 2016.

17 **Q. IS IT REASONABLE TO EXPECT CUSTOMERS TO PAY FOR THE**
18 **DISPOSAL OF COAL ASH?**

19 A. Yes. Those dollars are required to be spent in compliance with new coal ash
20 disposal requirements. Such a circumstance is not new in the history of
21 environmental regulations in the United States, where it is commonplace for
22 restrictions to be modified and become more restrictive over time. For

¹³ Goodman, Leonard, “The Process of Ratemaking,” Public Utility Reports, Vienna, Va, 1998, p. 322.

1 example, in our day-to-day life we have all experienced ever-tightening
2 environmental restrictions on the automobiles we drive, as the emissions
3 standards have grown increasingly stringent and more costly over the past few
4 decades and the related costs have increased the costs of driving.

5 So, too, have electric utility generating plants been the focus of ever-
6 tightening and more costly environmental standards. As an example, consider
7 the evolution of coal gas smokestack emission standards, which are generally
8 related to the federal Clean Air Act (“CAA”) and its various updates or
9 amendments.¹⁴ The enactment of the CAA of 1970 resulted in a major shift in
10 the federal government's role in air pollution control by authorizing the
11 development of comprehensive federal and state regulations to limit
12 emissions. The EPA was created on December 2, 1970, in large measure to
13 implement the various requirements of the CAA.¹⁵ Major revisions and
14 stricter clean air standards were adopted as updates to the CAA in 1977 and
15 1990 and these new standards impacted coal-fired generating plants.¹⁶

16 Following the CAA 1990 amendments, the EPA devised a strategy to
17 further reduce NOx emissions from coal-fired power plants by imposing
18 tighter NOx emissions standards. In addition, in 1998, the EPA issued a rule
19 that required 21 states (including North Carolina and South Carolina) to
20 further reduce NOx emissions through the use of newer, cleaner control

¹⁴ While sometimes the standards did not specifically target older coal-fired generating plants, invariably the more stringent standards would either impact a utility's total emissions limits, or a state's, consequently impacting even those older facilities that were not specifically targeted by newer emissions regulations.

¹⁵ See: <https://www.epa.gov/sites/production/files/2015-08/documents/peg.pdf>.

¹⁶ See: <https://www.epa.gov/clean-air-act-overview/clean-air-act-requirements-and-history>.

1 strategies.¹⁷.

2 Consequently, the history of environmental regulation is replete with
3 examples of ever-tightening environmental regulations with the result being,
4 with respect to utilities, the associated costs for meeting these ever-tightening
5 environmental regulations usually becoming the responsibility of customers.
6 Likewise, the issue of ever-tightening environmental regulations with respect
7 to coal ash standards is the genesis of the Company's request as it relates to
8 these new and additional coal ash disposal costs.

9 **Q. ARE CERTAIN COAL ASH COSTS NOT RELATED TO**
10 **COMPLIANCE WITH THE CCR RULE OR CAMA ALSO**
11 **RECOVERABLE FROM CUSTOMERS?**

12 A. Yes. As I mentioned earlier, DE Progress in South Carolina entered into a
13 Consent Agreement with DHEC applicable to ash management at the
14 Robinson Plant which requires ash excavation of a 1960 lay-of-land ash
15 storage area located south of the ash basin. This Consent Agreement also
16 includes provisions to initiate permitting of an on-site CCR lined landfill to
17 store the excavated ash. Additionally, the Company entered into a Settlement
18 Agreement with the South Carolina Office of Regulatory Staff and other
19 parties related to the recovery of certain coal ash remediation costs, and this
20 settlement was approved by this Commission in the aforementioned Order in
21 Docket No. 2016-227-E, dated Dec. 21, 2016, page 11, paragraph 15. All of
22 the costs related to the Robinson Plant Consent Agreement and costs related to

¹⁷ See: <http://instituteeforenergyresearch.org/studies/the-facts-about-air-quality-and-coal-fired-power-plants/>.

1 the aforementioned Settlement Agreement must all be recovered, or in the
2 latter case, continue to be recovered, even if these costs may be above those
3 necessary to comply with the CCR Rule or CAMA.

4 **Q. ARE THERE ANY COSTS RELATED TO CAMA THAT ARE IN**
5 **EXCESS OF THE FEDERAL CCR RULE'S COSTS THAT ARE**
6 **BEING REQUESTED IN THIS FILING?**

7 A. This is discussed in Company Witness Kerin's testimony. As he discusses,
8 there are some CAMA costs that are considered a system cost whose recovery
9 is being requested, but there are other North Carolina resident-specific costs
10 related to CAMA and not required by the CCR that the Company is not
11 seeking to recover from South Carolina customers.

12 **Q. DOES THE FACT THAT NEW STANDARDS WERE ADOPTED**
13 **MEAN THAT DE PROGRESS' PAST PRACTICES WERE**
14 **UNREASONABLE?**

15 A. No. It is well established that the standard for determining the prudence of a
16 utility's actions should be whether management decisions were made in a
17 reasonable manner and at an appropriate time on the basis of what was
18 reasonably known or reasonably should have been known at that time. To that
19 end, a basic public utility regulatory principle is that a decision's prudence
20 "must be based on a contemporaneous view of the action or decision under
21 question. Perfection is not required. Hindsight analysis – the judging of

1 events based on subsequent developments — is not permitted.”¹⁸ In short, the
2 Company’s decisions related to coal ash disposal must be judged in
3 accordance with the regulatory standards and industry practice as it existed at
4 the time the decisions were made based on the fact that this was the
5 information available to the Company at that time.

6 With respect to this prudence evaluation criteria, as discussed in the
7 direct testimony of Company Witness Kerin, the Company historically has
8 complied with all coal ash disposal regulations and used industry standard
9 disposal operations for all its coal ash handling operations. Today, the coal
10 ash disposal standards have simply changed and been updated as has occurred
11 with many environmental standards over time. In the past, the Company was
12 required to meet the coal ash disposal standards at the time, and so too it must
13 now comply with the new coal ash disposal standards.

14 **Q. IN YOUR OPINION ARE THE COAL ASH DISPOSAL COSTS THAT**
15 **DE PROGRESS IS SEEKING TO RECOVER IN THIS CASE “USED**
16 **AND USEFUL” UTILITY COST?**

17 A. Yes. DE Progress’s coal ash disposal sites have always been used and useful
18 as part of the coal-fired generation production process. As I discussed earlier
19 the Company’s coal fired generating plants, whether located in South Carolina
20 or North Carolina, have been used and useful and provided electric service
21 that produced economic benefits to customers in South Carolina for decades.
22 In addition, as referenced in the direct testimony of Company Witness Kerin,

¹⁸ Phillips, Charles F., The Regulation of Public Utilities, Public Utilities Reports, Arlington, VA.,1993, p. 340.

1 the Company has historically spent dollars in order to comply with the coal
2 ash disposal regulations in effect at the time, and these dollars were a
3 necessary expenditure related to used and useful utility costs made in the
4 provision of electric service at the time. The Company was, and continues to
5 be, obligated to meet the needs of its customers. This obligation to serve
6 requires the disposal of coal ash subject to the disposal standards at the time,
7 thereby rendering the disposal sites for this coal ash, for which costs DE
8 Progress seeks recovery in this case, “used and useful” in providing electric
9 service. In addition, it should be noted that these same costs were just found
10 to be “used and useful” in three different proceedings in North Carolina
11 including the Company’s proceeding last year where the North Carolina
12 Commission specifically stated that these type of costs were “used and useful
13 in the provision of service to the Company’s customers (Order, Docket E-2,
14 Sub 1131, page 18).

15 **Q. HAS THE COMMISSION ALREADY ADDRESSED THE RECOVERY**
16 **OF THESE SPECIFIC TYPE OF COAL ASH DISPOSAL COSTS**
17 **WITH ANOTHER ELECTRIC UTILITY?**

18 A. Yes. As I mentioned, in Docket No. 2016-227-E, DE Progress was allowed to
19 recover these same coal ash expenses, albeit the Order did state that this
20 finding had no precedential effect and will not prejudice the position of any
21 Party in any future proceeding before the Commission.¹⁹

¹⁹ Order in Docket No. 2016-227-E, Dec. 21, 2016, page 11, paragraph 15.

1 **Q. ARE THERE EXAMPLES OF UTILITY INFRASTRUCTURE**
2 **PROJECTS THAT DEALT WITH AN ENVIRONMENTAL ISSUE**
3 **AND COST RECOVERY THAT IS SIMILAR IN NATURE TO THE**
4 **COAL ASH ISSUE IN THIS FILING?**

5 A. I believe a similar situation that is instructive are the ongoing costs related to
6 gas pipeline safety and integrity. Like coal ash regulations, these pipeline
7 safety and integrity regulations have changed and become more costly over
8 the past few years. For example, in 2011 the DOT and Pipeline and
9 Hazardous Materials Safety Administration (“PHMSA”), promulgated
10 regulations that require inspection, repair, rehabilitation and/or replacement of
11 the highest risk natural gas pipeline infrastructure by pipeline operators. The
12 program included an inventory of pipelines by type, system evaluation to
13 identify risks and an implementation plan to mitigate those risks. South
14 Carolina natural gas systems have had expenditures to comply with these new
15 regulations and South Carolina Electric & Gas Company has been allowed to
16 collect these costs through a deferral mechanism, including a return, and
17 collect these costs over time (Docket. No. 2014-461-G, see filings dated Dec.
18 3, 2014, ORS filing dated Dec. 10, 2014, and Commission Directive dated
19 Dec. 17, 2014).

20 **Q. ARE THERE OTHER EXAMPLES OF ENVIRONMENTAL COST**
21 **RECOVERY SIMILAR TO THE COST RECOVERY OF COAL ASH**
22 **DISPOSAL?**

23 A. Yes. As I mentioned earlier in this testimony, in this Commission’s Docket

1 No. 2011-271-E, costs associated with a Cliffside scrubber were amortized
2 and in the rate base. In addition, in Docket No. 2009-226-E costs associated
3 with scrubbers at the Allen Steam Station were amortized and in rate base.

4 **Q. ARE THERE POTENTIAL COST SHARING LIABILITIES RELATED**
5 **TO THESE COAL ASH DISPOSAL COSTS THAT MIGHT**
6 **MATERIALIZE AND THUS DIMINISH THE OVERALL COST**
7 **IMPACTS ON CUSTOMERS?**

8 A. Yes. The Company has filed insurance litigation. When and if those monies
9 materialize, customers should see the benefit of those proceeds, like spent fuel
10 litigation. However, these cases can take many years to finally resolve. It
11 would be appropriate for the Commission to monitor these cases and ensure
12 that any outcome benefits customers. It is my understanding that the
13 Company has no objection to that approach.

14 **Q. ARE THERE WAYS THAT THE COMPANY MIGHT SUGGEST**
15 **THAT THE COMMISSION COULD ADOPT AS A MEANS OF**
16 **MITIGATING THE OVERALL RATE IMPACT FROM THESE NEW**
17 **ADDITIONAL COSTS?**

18 A. Yes. For example, it is not unusual for such costs to be stretched out over a
19 number of years so that the impact on rates is more manageable. If that type
20 of option is adopted, however, then it is appropriate for the utility to receive
21 carrying costs to ensure it is made whole for all costs.

1 **Q. BECAUSE ONLY PRUDENTLY INCURRED COSTS ARE**
2 **RECOVERABLE, HAVE YOU EXAMINED WHETHER THE**
3 **ACTUAL DOLLARS BEING REQUESTED BY THE COMPANY ARE**
4 **REASONABLE AND PRUDENT?**

5 A. I have examined the filing, many of the Federal and State laws related to coal
6 ash disposal, the testimony of Company Witness Kerin and other Company
7 witnesses, reviewed past Commission Orders regarding environmental cost
8 recovery, discussed with the Company its history related to coal ash disposal,
9 and reviewed the more recent settlement agreements related to coal ash
10 disposal. Based on my review, I believe that the Company is in the best
11 position to address coal ash disposal and the related costs in conformance with
12 State and Federal coal ash disposal requirements and I believe their actions in
13 this regard are prudent.

14 **Q. DO YOU BELIEVE THE COMPANY'S COAL ASH COST**
15 **RECOVERY PROPOSAL IS REASONABLE?**

16 A. Yes. I believe that the Company's proposals to recover its costs for
17 complying with updated coal ash disposal regulations are reasonable and
18 consistent with the historical regulatory treatment of similar costs.

19 **Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY**
20 **AT THIS TIME?**

21 A. Yes.

**Dr. Julius A. "Chip" Wright
J. A. Wright & Associates, LLC**

Julius A. "Chip" Wright is the President of J. A. Wright and Associates, LLC
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Experience Overview

Prior to starting his firm, Dr. Wright was a Client Partner for AT&T Solutions Utilities and Energy Practice and before that a Principal in EDS' Management Consulting Services. Dr. Wright has been consulting electric gas, and telephone utilities on regulation, economics, rates, production modeling and strategic planning for the past three years. Prior to this Dr. Wright served an eight-year term as a Utility Commissioner for the state of North Carolina. Prior to that he served three terms in the North Carolina State Senate while he was a senior project engineer for Corning Glass Works on their optical wave guide project in Wilmington, North Carolina. He has a total of 14 years' government-related experience, 12 years' plant-related engineering experience, and he has established two companies.

Dr. Wright (in 2011) has also been a Visiting Professor at the University of the Virgin Islands teaching sophomore courses in both Macro and Micro Economics.

While serving on the North Carolina Utility Commission, he served four years on the National Association of Regulatory Utility Commissioners (NARUC) Electricity Committee. He

has served in various other advisory capacities, including the Keystone

Committee on Externalities; the North Carolina Radiation Protection Committee, and on an Oversight Committee for a joint North Carolina/New York/ Department of Energy (DOE) project.

Dr. Wright has also served on the Southern States Energy Board Task Force on Restructuring the Electric Utility Industry.

Regulatory Policy Issues, Prudence Reviews and Regulatory Studies

- Presented testimony and rebuttal testimony to the North Carolina Utility Commission in support of Duke Energy Carolinas' efforts to recovery coal ash remediation costs the Company incurred in response to new coal ash disposal costs, Feb., 2017, Docket No. E-7, Sub 1146.
- Presented testimony and rebuttal testimony to the North Carolina Utility Commission in support of Duke Energy Progress' efforts to recovery coal ash remediation costs the Company incurred in response to new coal ash disposal costs, June and November, 2017, Docket No. E-2, Sub 1146.
- Prudence review: report for Georgia Power Company regarding the prudence of Plant Vogtle new nuclear construction costs, *"The South Carolina Public Service Commission's Prudence Reviews of Summer Units 2 and 3 as Persuasive*

Precedent for the Georgia Public Service Commission's Regulatory Treatment of Vogtle Units 3 and 4, April 5, 2016, Georgia Public Service Commission, Docket No 29849.

- Regulatory study: “*The Economic and Rate Implications from an Electric Utility's Loss of Large Load Customers,*” presented in rebuttal testimony for Progress Energy Carolinas, North Carolina Utility Commission Docket No. E-2, Sub 1023, March 4, 2013.
- Regulatory study: Dr. Wright routinely provides testimony support and witness training to several Fortune 500 investor-owned utilities in the Southeast, most recently involving two rate cases (2011, 2012) and three rate related cases dealing with an ongoing nuclear construction project (2008, 2010, 2012).
- Prudence review: related to a review of affiliate cost structure relative to compliance with FERC Order 707, conducted for a major SE utility, 4th quarter, 2008.
- Prudence review: related to a review of Affiliate Cost for Service Company Charges to a Regulated Utility, study conducted for SCANA Corporation, May, 2008.
- Regulatory study: review of Electric Utility Formula Rate Plans and specific Entergy formula rate plans, conducted for Entergy Mississippi, Jan-May, 2008.
- Prudence review: June 2005, provided a financial analysis related to the options for collecting and saving nuclear plant decommissioning costs for Duke Energy and this study along with a presentation was provided to the North Carolina Public Utility Commission and Staff.
- Regulatory study: provided analysis for Entergy Mississippi that was presented to the Mississippi Public Service Commission related to the valuation of services that Company provided to an unregulated affiliate, November 2002.
- Prudence review: “*Energy Deregulation,*” March 2001, report of the California State Auditor on the causes of the problems related to high electric prices and blackouts (from May, 2000 through June 2001, and ongoing) in California's restructured electric marketplace. Dr. Wright was one of three consultants who essentially researched and prepared the State Auditor's report.
- Prudence review: Principal author with Dr. Al Danielsen of “*Reliability of Electric Supply In Georgia,*” published by The Bonbright Utilities Center,

University of Georgia, June, 2001.

- Regulatory study: Presented testimony before the North Carolina Public Utilities Commission on behalf of SCANA Corporation regarding issues related to market power in its merger with Public Service Company of North Carolina, Docket No. G-5, Sub 400; G-3, Sub 0.
- Prudence review: was the principal author of a report and investigation titled "*An Analysis of Commonwealth Edison's Planning Process For Achieving Reliability of Supply*," which was an investigation of the Company's planning process to meet its statutory obligation for supplying electricity as Illinois transitions to a competitive retail electric market, Illinois Commerce Commission Docket No. 98-0514.
- Regulatory study: co-authored a national study that used computer modeling techniques to quantify the impact of electric competition on the aggregate economy in each of the 48 continental United States.
- Regulatory study: presented testimony to Louisiana Legislative Committee on behalf of Entergy Corporation regarding the various regulatory and technical issues that need to be addressed in the transition to competition.
- Regulatory study: presented testimony For Virginia Power with regard to its transition to competition plan.
- Regulatory study: testified before the Mississippi Public Service Commission on issues related to the establishment of retail electric competition, including ISO establishment, regional power exchanges, legislation, taxes and regulatory policies.
- Regulatory study: presented testimony for Entergy Corp. in both Louisiana and Arkansas in support of its transition to competition filing.
- Regulatory study: worked with three major southeastern utilities on developing business and regulatory strategy as they prepare for competition.
- Regulatory study: filed a report with the South Carolina Legislature that studied the impact of electric competition on the state of South Carolina.
- Was a panelist on a Southern Gas Association national televised forum on performance based regulation for the natural gas industry.
- Regulatory study: Was the lead policy witness for South Carolina Electric and Gas on obtaining regulatory approval to transfer of depreciation reserve from a nuclear plant to T&D

depreciation reserve. This is a critical issue in preparing for competition and limiting stranded investment.

- Developed regulatory and marketing strategy for Entergy with regard to its telecommunications initiatives. In these efforts he worked with the EDS Telecommunications Consulting Group.
- Prudence review: was the lead analysis of the prudence of Central Vermont Public Service Company's power and resource acquisitions over a five year period. The prudence of this utility's power supply strategy was under investigation in a rate case proceeding. Dr. Wright's team filed testimony supporting the Company and their efforts were instrumental in undermining the charges of imprudence brought by the Company's opposition.
- Regulatory study: developed an EDS intra-company task force to address the issues related to FERC's Transmission NOPR. This task force subsequently filed three responses to FERC's Open Access NOPR which provide a basis for EDS to maintain a leadership position as the electric utility industry undergoes restructuring to a competitive market.
- Regulatory study: helped develop a regulatory strategy and presented testimony on behalf of

South Carolina Pipeline. In this case, an economic analysis prepared by Dr. Wright and Dr. Frank Cronin (from EDS Economic Planning and Analysis Consulting Group) was presented along with recommendations. The analysis and recommendations were generally accepted by the Commission staff.

- Prudence reviews: as a North Carolina Utility Commissioner Dr. Wright was involved in the prudence reviews of the costs related to the construction of three nuclear plants, Catawba 1 & 2 and Shearon Harris. In addition, he was involved in several other prudence reviews of various utilities.

Resource Planning & Economic Analysis

As a Commissioner he has been involved in a variety of resource planning issues including chairing the last North Carolina Resource Planning hearing that involved Duke Power Company, Carolina Power and Light, Virginia Power Company and the North Carolina Electric Membership Corporation.

He was also selected by the states of North Carolina and New York and the Department of Energy to be one of five representatives on a peer review panel overseeing a Resource Planning project being conducted by the Oak Ridge National Laboratories. In addition to these initiatives Dr. Wright has:

- *“The Economic and Rate Implications from an Electric Utility’s Loss of Large Load Customers,”* presented in rebuttal testimony for Progress Energy Carolinas, North Carolina Utility Commission Docket No. E-2, Sub 1023, March 4, 2013.
- Provided an analysis of electric vehicle economics and the legislative, engineering, and regulatory issues that regulated electric utilities should address in both residential and commercial installments of electric vehicle charging stations. Studied performed for Fortune 500 Southeastern investor-owned utilities, 2011-2012.
- Provided a study to a Fortune 500 large Southeastern investor-owned utility related to the use of regulated electric rates designed to help retain current large industrial customers, 2012.
- Provided a Fortune 500 large Southeastern based investor-owned electric utility an economic, engineering, and environmental evaluation of a proposed renewable fuel alternative including the provision of an assessment and the design for a large-scale pilot test in one of that utility’s fossil-fired facilities, 2012.
- Provided testimony for Entergy Mississippi related to whether the Mississippi Public Service Commission should adopt some proposed Federal standards related to integrated resource planning and energy efficiency, Docket No. 2008-AD-477, February 2009.
- Provided a report to Entergy Mississippi on fuel cost recovery mechanisms that included a nationwide survey of fuel adjustment mechanisms, 2008.
- Provided testimony in North Carolina for Duke Energy related to whether the North Carolina Public Utility Commission should approve the recovery of nuclear generation project development costs, Docket No. E-7-Sub 819, April 2008.
- Provided a review for Duke Energy of the cost assumptions and regulatory initiatives related to new nuclear plant construction nationwide, April 2008.
- Provided analysis for Entergy Mississippi related to new nuclear plant applications and any new regulatory mechanisms adopted by various states related to the approval or cost recovery associated with these new nuclear plants, April 2008.
- Presented testimony on behalf of Entergy Mississippi on its IRP or electric resource plan and demand side initiatives, June, 2008, Docket No. 2008-AD-158.
- Provided testimony in Georgia for Georgia Power Company supporting that Company's Integrated Resource Planning

process, the appropriate methods for evaluating demand side energy options, and supporting that Company's planned demand side programs, Docket No. 24505-U, June 2007.

- Provided testimony in North Carolina for Duke Energy and Progress Energy related to the regulatory and economic rationale and appropriateness for using the "peaker" methodology and other methodologies for the establishment of avoided cost rates, Docket No. E-100-Sub 106, June 2007.
- Provided analysis for Entergy Mississippi that was presented to the Mississippi Public Service Commission related to the valuation of services that Company provided to an unregulated affiliate, November 2002.
- Was the lead policy witness for South Carolina Electric and Gas on obtaining regulatory approval to transfer depreciation reserve from a nuclear plant to T&D depreciation reserve. This is a critical issue in preparing for competition and limiting stranded investment.
- Was instrumental in acquiring a large engagement for a major southeastern utility examining their competitive position as it relates to a competitive electric market. During the engagement he provided input and guidance on regulatory issues related to the

deregulation of the electric industry.

- Assisted Carolina Power and Light Company in their integrated resource planning process by advising and facilitating a Commission directed public policy panel.
- Developed an overview of Niagara Mohawk Gas' integrated resource planning efforts. This engagement was under a contract from Oak Ridge National Laboratories.

Renewable Fuels, Demand Side, Energy Efficiency

- Provided an analysis of electric vehicle economics and the legislative, engineering, and regulatory issues that regulated electric utilities should address in both residential and commercial installments of electric vehicle charging stations. Studied performed for Fortune 500 Southeastern investor-owned utilities, 2011-2012.
- Provided a Fortune 500 large Southeastern based investor-owned electric utility an economic, engineering, and environmental evaluation of a proposed renewable fuel alternative including the provision of an assessment and the design for a large-scale pilot test in one of that utility's fossil-fired facilities, 2012.

- Provided testimony for Entergy Mississippi related to that Company's proposed new demand side initiatives Docket No. EC-123-0082-00, February 2009.
 - Provided testimony for Entergy Mississippi related to whether the Mississippi Public Service Commission should adopt some proposed Federal standards related to integrated resource planning and energy efficiency, Docket No. 2008-AD-477, February 2009.
 - Presented testimony on behalf of Public Service of North Carolina supporting that Company's proposed demand side initiatives as well as the cost recovery of those initiatives, Docket No. G-5, Sub 495, March 2008.
 - Provided testimony in South Carolina for Duke Energy, South Carolina Electric and Gas, and Progress Energy related to whether the South Carolina Public Service Commission should adopt some proposed Federal standards related to smart metering and energy efficiency rate setting procedures, Docket No. 2005-386-E, April, 2007.
 - Provided testimony in South Carolina for South Carolina Electric and Gas related to Integrated Resource Planning and that Company's demand side initiatives, June 2007.
 - Provided testimony in Georgia for Georgia Power Company supporting that Company's Integrated Resource Planning process, the appropriate methods for evaluating demand side energy options, and supporting that Company's planned demand side programs, Docket No. 24505-U, June 2007.
 - Provided testimony in North Carolina for Duke Energy and Progress Energy related to whether the North Carolina Public Utility Commission should adopt some proposed Federal standards related to smart metering, energy efficiency, and electric resource planning, Docket No. E-100-Sub 108, November 2006.
- Nuclear Issues***
- Prudence review: report for Georgia Power Company regarding the prudence of Plant Vogtle new nuclear construction costs, *"The South Carolina Public Service Commission's Prudence Reviews of Summer Units 2 and 3 as Persuasive Precedent for the Georgia Public Service Commission's Regulatory Treatment of Vogtle Units 3 and 4,"* April 5, 2016, Georgia Public Service Commission, Docket No 29849.
 - Dr. Wright provided testimony support and witness training involving three rate related cases dealing with an ongoing nuclear

construction project (2008, 2010, 2012).

- Provided testimony in North Carolina for Duke Energy related to whether the North Carolina Public Utility Commission should approve the recovery of nuclear generation project development costs, Docket No. E-7-Sub 819, April 2008.
- August 2008 provided a study to Duke Energy Carolinas examining the issue of cost justification for new nuclear power facilities.
- June, 2005, provided a financial analysis related to the options for collecting and saving nuclear plant decommissioning costs for Duke Energy and this study along with a presentation was provided to the North Carolina Public Utility Commission and Staff.

Cost of Service, Rate Design, Forecasting

While serving more than eight years on the North Carolina Commission, Dr. Wright was involved in several cost of service and rate design analyses, testimonies, and orders. This included work in electric, telephone, gas, and water utilities. Additionally, he has presented testimony on performance based ratemaking and he has been involved in analyzing electric utility forecasting models, including end-use models, regression analysis (both linear and nonlinear) and customer discrete choice modeling forecasts. Furthermore, Dr. Wright's Ph.D. is in environmental

and regulatory economics with special research into nonlinear minimal cost optimization procedures for electric utility production models. This work included optimizing investments, optimal regulatory regimes, pricing, cost recovery, and rate of return issues.

In addition, he has:

- *"The Economic and Rate Implications from AN Electric Utility's Loss of Large Load Customers,"* presented in rebuttal testimony for Progress Energy Carolinas, North Carolina Utility Commission Docket No. E-2, Sub 1023, March 4, 2013.
- Provided a study to a Fortune 500 large Southeastern investor-owned utility related to the use of regulated electric rates designed to help retain current large industrial customers, 2012.
- Presented testimony on behalf of Public Service of North Carolina related to the establishment of a formula type rate setting mechanism for this natural gas LDC, August 2008, Docket No. G-5, Sub 495.
- Provided testimony in Georgia for Georgia Power Company supporting that Company's methodology for pricing fuel and its use of marginal replacement fuel cost procedures in its intra-company resource sharing arrangement with the Southern company, Docket No. 191142-U, April 2005.

- Provided an economic analysis of the proper regulatory regime for South Carolina Pipeline Company. In this analysis he presented testimony supporting performance based ratemaking and his recommendations were generally accepted by the Commission staff.
- Developed forecasted rates for two New York state utilities. These rates were developed to support a bond filing by a co-generator.
- Provided a forecast of power payments from New York State Electric and Gas (NYSEG) to two independent power producers (IPPs). This forecast was used to estimate the level of overpayments by NYSEG to these IPPs, under PURPA regulations, which he used in a filing before FERC supporting the company's claim of unlawful overpayments.

Telecommunications

As a Commissioner he has regulated all types of telecommunications providers for eight years. In addition, he has worked with two electric utilities in strategy formulation in regard to their entering the telecommunications business. Furthermore, he has eight years experience as a fiber optic engineer.

Other Areas of Expertise

Prior to joining EDS, he worked for eight years as a senior process engineer for Corning Glass in the design and

production of optical waveguides (or fiber optics). Prior to that he worked for four years in the chemical industry as a process chemist and later as a senior project engineer. He has done work in environmental monitoring, process and product improvement, plant utilization, as well as starting and selling two successful companies – one in the financial leasing business and the other in the entertainment industry.

Presentations and Publications

Report for Georgia Power Company regarding the prudence of Plant Vogtle new nuclear construction costs, *"The South Carolina Public Service Commission's Prudence Reviews of Summer Units 2 and 3 as Persuasive Precedent for the Georgia Public Service Commission's Regulatory Treatment of Vogtle Units 3 and 4,"* April 5, 2016, Georgia Public Service Commission, Docket No 29849.

"The Economic and Rate Implications from AN Electric Utility's Loss of Large Load Customers," presented in rebuttal testimony for Progress Energy Carolinas, North Carolina Utility Commission Docket No. E-2, Sub 1023, March 4, 2013.

"Energy Deregulation," March 2001, report of the California State Auditor on the causes of the problems related to high electric prices and blackouts (from May, 2000 through June 2001, and ongoing) in California's restructured electric marketplace. Dr. Wright was one of three consultants who essentially researched and prepared the State Auditor's report.

“Low Cost States and Electric Restructuring - The Issue is the Price!” presented to the 1999 Miller Forum on Government, Business and the Economy, University of Southern California, April 19, 1999.

An Analysis of Commonwealth Edison’s Planning Process For Achieving Reliability of Supply, Illinois Commerce Commission Docket No. 98-0514.

The Impact of Competition on the Price of Electricity, author, published by L. A. Wright and Associates, November, 1998.

“Retail Competition in the Electric Industry: The Impact on Prices,” presented at the 18th Annual Bonbright Center Energy Conference, Atlanta, Georgia, Sept. 10, 1998.

Potential Economic Impacts of Restructuring the Electric Utility Industry, co-author, published by the Small Business Survival Committee, Washington, DC, November, 1997.

“How Deregulation Will Affect Power Quality and Energy Management,” presented at the Power Quality and Energy Management Conference co-sponsored by Entergy and EPRI, New Orleans, LA, Nov. 14, 1997.

“Deregulation of the Electric Industry,” *Proceedings: National Business Energy Forum*, June 26, 1997, New Orleans, LA.

“A Different View of the Market,” presented at the Southeastern Electric Exchange Conference, June 25, 1997, Charlotte, N.C.

“Restructuring The Electric Utility Industry: Theory vs. Reality,” presented at the American Bar Association Restructuring Conference, Raleigh, NC, Dec. 5, 1996.

“Restructuring: The Best Approach for Virginia,” presented at the Virginia State Corporation Commission Electricity Restructuring Forum, Charlottesville, VA, Nov. 15, 1996.

“Alternative Rate Making for the Natural Gas Industry: State Issues,” presented at the Tenth Annual NARUC Biennial Regulatory Information Conference, Columbus, Ohio, Sept. 12, 1996.

“RetailCo: To Regulate or Not?” presented at the 9th Annual Automatic Meter Reading Symposium, New Orleans, La., Sept. 10, 1996.

“Convergence: The Competitive Revolution Comes To Electric Power,” presented to the Southeastern Association of Regulatory Commissioners Annual Convention, Point clear, Alabama, June 4, 1996.

“Stranded Assets Recovery Issues,” presented at the Western Electric Power Institute: Financial Forum, Tucson, Arizona, March 8, 1996.

“The Deregulation of the Electric Utility Industry : Current Status,” presented at the North Carolina Economic Developers Association Midwinter Conference, Pinehurst, N.C., February 23, 1996.

“Performance Based Regulation for The Natural Gas Industry,” panelist on Southern Gas Association’s Televised

Regulatory Forum, Dallas, Texas, Jan. 18, 1996.

“Industry Structure Should Meet Stakeholder Objectives,” *Electric Light and Power*, Jan., 1996.

“Quantifying the Value of Stranded Investment: A Dynamic Modeling Approach,” *Proceedings: Implementing Transmission Access and Power Transactions Conference*, Denver, Colorado, Dec. 14, 1995.

“Quantifying the Value of Stranded Investment: A Dynamic Modeling Approach,” at the 15th Annual Bonbright Center Electric and Natural Gas Conference, October 9-11, 1995, Atlanta, Georgia.

Comments to FERC in the matter of Notice of Proposed Rulemaking on Open Access, Docket No. 95-9-000, 1995.

“The Road to Competition for Re-Regulated Industries,” presented at the 1995 PROMOD users Forum, St. Petersburg, Florida, May 1, 1995.

“*Comparing New York State Electric and Gas Corporation’s Non-Utility Generator Payments to Current Avoided Cost Rates*,” report submitted in support of affidavit filed before FERC in Docket No. EL 95-28-000.

“A Solution To The Transmission Pricing and Stranded Investment Problems” *Public Utilities Fortnightly*, January 1995.

“Electric Utility Competition: The Winning Focus,” presented at 1994 Southeastern Electric and Natural Gas

Conference, Atlanta, Georgia, October 1994.

“*Gas Integrated Resource Planning: The Niagara Mohawk Experience*,” for Martin Marietta Energy Systems, Inc., under contract to the United States Department of Energy, ORNL/SUB/93-03369.

“Future Regulation In the Water Industry - Can We Solve the Problems Before They Happen?” *Water*, Vol. 29, No. 2, pp. 14-17, Summer 1988.

“The Regulatory Process - Historical and Today,” presented at Carolina Power and Light Company’s IRP Public Participation Committee Seminar, June 1994.

“The Regulatory Role In DSM: Who Pays?” presented at Carolina Power and Light Company’s IRP Public Participation Committee Seminar, June 1994.

“The Regulatory Process In North Carolina,” North Carolina Telephone Association, June 1991.

Testimony

- Presented testimony and rebuttal testimony to the North Carolina Utility Commission in support of Duke Energy Carolinas’ efforts to recovery coal ash remediation costs the Company incurred in response to new coal ash disposal

costs, Feb., 2017, Docket No. E-7, Sub 1146.

- Presented testimony and rebuttal testimony to the North Carolina Utility Commission in support of Duke Energy Progress' efforts to recovery coal ash remediation costs the Company incurred in response to new coal ash disposal costs, June and November, 2017, Docket No. E-2, Sub 1146.
- Presented testimony before the Mississippi Public Service Commission on behalf of Entergy Mississippi, Inc., in support of that company's revisions to its Formula Ratemaking procedures, Docket No. 2014-UN-132, June 2014.
- Rebuttal testimony for Progress Energy Carolinas, related to the economic and rate implications from an electric utility's loss of large load customers, North Carolina Utility Commission Docket No. E-2, Sub 1023, March 4, 2013.
- Provided a study to a Fortune 500 large Southeastern investor-owned utility related to the use of regulated electric rates designed to help retain current large industrial customers, and developed proposed testimony in support of this issue, 2012.
- Provided an affidavit in support of Progress Energy Carolinas to the North Carolina Utility Commission in a proceeding considering the appropriate

avoided cost rates that should be paid to an independent power producer, Sept., 2010, Docket No. E-2, Sub 966.

- Presented testimony on behalf of Entergy Mississippi in an investigation of the Commissions procedures concerning confidentiality, August, 2010, Docket No. 2010-AD-259.
- Presented testimony before the Mississippi Public Service Commission on behalf of Entergy Mississippi, Inc., in support of the formula rate plan annual evaluation, Docket No. 2002-UN-526, March, 2009.
- Presented testimony before the Mississippi Public Service Commission on behalf of Entergy Mississippi, Inc., in support of an energy efficiency pilot program and cost recovery mechanism, Docket No. 2009-UN-064, February, 2009.
- Presented testimony before the Mississippi Public Service Commission on behalf of Entergy Mississippi, Inc., in a proceeding to review statewide energy generation needs, Docket 2008-AD-270, August 2008.
- Presented testimony on behalf of Public Service of North Carolina related to the establishment of a formulary type rate setting mechanism for this natural gas LDC, August, 2008, Docket No. G-5, Sub 495.

- Presented testimony on behalf of Entergy Mississippi in an investigation of that utility's fuel charges and its fuel cost recovery, July, 2008, Docket No. 2008-AD-270.
- Presented testimony on behalf of Entergy Mississippi on its IRP or electric resource plan and demand side initiatives, June, 2008, Docket No. 2008-Ad-158.
- Presented testimony for Duke Energy in North Carolina related to the approval to incur pre-construction costs for the proposed Lee Nuclear Station, Docket No. E-7, Sub 819, May, 2008.
- Presented testimony for Duke Energy in South Carolina related to the approval to incur pre-construction costs for the proposed Lee Nuclear Station, Docket No. 2007 -440-E, June, 2008.
- Presented rebuttal testimony for Duke Energy in North Carolina related to the recovery of costs incurred by Duke related to GridSouth and why these expenses should be fully recoverable at this time, Docket No. E-7, Sub 828, October, 2007.
- Provided testimony for Georgia Power in its 2007 Integrated Resource Plan reviewing the plan filed by the Company and discussing how its demand-side proposals were reasonable, compared the Company's demand-side proposals to those found in neighboring states, and discussed the application of the various tests used to evaluate demand-side programs (TRC, RIM, PTC), Docket number 24505-U, May, 2007.
- Presented two testimonies before the South Carolina Public Service Commission on behalf of South Carolina Electric and Gas, Duke Energy and Progress Energy Carolinas in the investigation of adoption of energy efficiency and generation standards related to the Energy Policy Act of 2005, Dockets No. 2005-385-E and No. 2005-386-E, April, 2007.
- Presented testimony before the North Carolina Public Utilities Commission on behalf of Duke Energy and Progress Energy Carolinas in the investigation of adoption of energy efficiency and generation standards related to the Energy Policy Act of 2005, Docket No. E-100, Sub 108 November 2006.
- Presented testimony before the North Carolina Public Utilities Commission on behalf of Duke Energy in the investigation of Duke Energy's 2006 Integrated Resource Plan, Docket No. E-100, Sub 103, June, 2006.
- Provided testimony for Georgia Power in its 2005 Fuel Adjustment Hearing on the issue of the appropriate pricing

methodology for the dispatch and sale of electricity in the Southern Company system, Docket number 19142-U, April, 2005.

- Presented testimony on behalf of South Carolina Electric and Gas Company before the South Carolina Public Utility Commission for South Carolina Pipeline Company related to the inclusion of a generating plant in rate base and to the recovery of RTO (Gridsouth) related costs, Docket No. 2004-178-E, October, 2004.
 - Presented testimony on behalf of Entergy Mississippi before the Mississippi civil court dealing with maintaining the confidentiality of special use contracts, August, 2004.
 - Presented rebuttal testimony before the South Carolina Public Utility Commission for South Carolina Pipeline Company related to the reasons for continuing a program that allows flexible, competitive based pricing for large, interruptible customers that have alternative fuels, Docket No. 2004-6-G, May 29, 2004.
 - Presented testimony before the Georgia Public Service Commission on the appropriate range for a return on equity earnings band (a form of performance based regulation) to set in a Savannah Electric & Power Company rate case,
- Docket No. 14618-U, April, 2002.
- Presented testimony before the Georgia Public Service Commission on behalf of Scana Energy Marketing related to affiliate relationships and the appropriate affiliate rules between Atlanta Gas Light Company's regulated and unregulated affiliates. Docket No. 146060-U, August 24, 2001.
 - Presented testimony before the Georgia Public Service Commission on the appropriate range for a return on equity earnings band (a form of performance based regulation) to set in a Georgia Power Company rate case, Docket No. 14000-U, November 19, 2001.
 - Presented testimony before the North Carolina Public Utilities Commission on behalf of SCANA Corporation regarding issues related to market power the appropriate affiliate relationship protections necessary in its merger with Public Service Company of North Carolina, Docket No. G-5, Sub 400; G-3, Sub 0.
 - Presented testimony before the South Carolina Public Service Commission on behalf of South Carolina Pipeline Corporation regarding issues related to its annual review of gas costs as reflected in its purchase gas adjustment charge, Docket No. 1999-007-G, September, 1999.

- Presented testimony before the Arkansas Public Service Commission on behalf of Entergy Arkansas, Inc. regarding regulatory policies related to the definition of public utilities as it impacts citing requirements of non-utility owned generating facilities, Dockets No. 98-337-U, March 9, 1999.
- Presented Rebuttal and Surrebuttal testimony before the Louisiana Public Service Commission on behalf of Entergy Louisiana, Inc. and Entergy Gulf States regarding regulatory policies related to stranded cost recovery and on the issue of whether investors have been compensated for the risk of not recovering stranded costs, Dockets Nos. U-22092SC and U-20925, September, 1998.
- Presented testimony to the South Carolina Public Utility Commission for South Carolina Pipeline Corp. related to acquisition adjustments and regulatory policies related to performance based regulation, Docket No. 90-588-G, June, 1998.
- Testified before the Mississippi Public Service Commission on issues related to the establishment of retail electric competition, including ISO establishment, regional power exchanges, legislation, taxes and regulatory polices, April 16, 17, 1997.
- Support of Transition Proposals filed by Virginia Power Corporation, March, 1997.
- Entergy Arkansas testimony in support of Transition to Competition Filing, 1997.
- Entergy Louisiana testimony in support of Transition to Competition Filing, 1997.
- Support of Performance Based Regulation for GTE South Inc., Docket No. P-19, Sub 277, before the North Carolina Utility Commission, filed Nov. 22, 1995.
- Stranded Cost Regulatory Policy and Recovery Testimony before the South Carolina Public Service Commission, the Commission approved the request Dr. Wright was advocating, Docket No. 95-1000-E, October 27, 1995.
- Performance based rate making mechanism and rate levels, testimony on behalf of South Carolina Pipeline Corporation, Docket No. 90-588-G, filed August 3, 1995.
- Prudence Review of Power Resource Planning for Central Vermont Public Service Company, Docket No. 5724, September 7, 1994.
- Rebuttal testimony on behalf of Central Vermont Public Service Company, Docket 5724, September 7, 1994.

- Surrebuttal testimony on behalf of Central Vermont Public Service Company, Docket No. 5724, September 9, 1994.

Education

Dr. Wright received a Ph.D. in Economics from North Carolina State University, focusing on regulatory and environmental economics, and is a member of the honor society.

He received an MBA in finance from Georgia State University in 1978, graduating with honors.

He received a Master of Economics from North Carolina State University in 1991 and was a member of the honor society.

He received a B.S. in Chemistry from Valdosta State College in Valdosta, Georgia, graduating Magna Cum Laud.

In addition, he has completed the Michigan State University Regulatory Course, several other NARUC courses on regulation, been an instructor on regulatory issues at several NARUC courses, completed management courses at Corning Glass and financial seminars at Bank Boston and Merrill Lynch dealing with regulation.

Dr. Wright (in 2011) has also been a Visiting Professor at the University of the Virgin Islands teaching sophomore courses in both Macro and Micro Economics.